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IS . 4303 ( Part II ) - 1975

(Reaffirmed - 2012)

# *Indian Standard*

# CODE OF HYGIENIC CONDITIONS FOR FISH INDUSTRY

## PART II CANNING STAGE

## *( First Revision )*

UDC 661.95 : 613.6

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# *Indian Standard*

# CODE OF HYGIENIC CONDITIONS FOR FISH INDUSTRY

## PART II CANNING STAGE

## ( *First Revision* )

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# AMENDMENT NO. 1 JANUARY 1984
# TO
# IS:4303(Part 2)-1975 CODE OF HYGIENIC CONDITIONS FOR FISH INDUSTRY
## PART 2 CANNING STAGE

*(First Revision)*

## Corrigenda

(*Page 5, clause 2.17, heading*) - Substitute 'Panelled Container' *for*'Papelled Container'.

(*Page 5, clause 2.24*):

a) *line 2* - Substitute 'bulging' *for* 'buldging'

b) *line 3* - Substitute 'bulges' *for* 'buldges.

## Alterations

(*Page 9, clause 4.4.6, line 2*) - Substitute 'tin plate' *for* 'material' and 'hermetically' *for* 'easily'.

(*Page 9, clause 4.4.16, line 2*) - Substitute 'half an hour' *for* 'one hour'.

(*Page 11, clause 4.7.1, lines 6 and 7*) - Delete the following:

'urine; and blood examination for venereal diseases.'

(*Page 11, clause 4.7.3*) - Substitute the following for the existing clause:

'4.7.3 All employees shall be inoculated against typhoid and paratyphoid A diseases on their first appointment and thereafter, once in every five years. In case of epidemic all workers shall be inocualted. A record shall be maintained.'

(AFDC 36)

Reprography Unit, ISI, New Delhi, India

# *Indian Standard*

# CODE OF HYGIENIC CONDITIONS FOR FISH INDUSTRY

## PART II CANNING STAGE

## *( First Revision )*

## 0. FOREWORD

**0.1** This Indian Standard ( Part II ) ( First Revision ) was adopted by the Indian Standards Institution on 21 October 1975, after the draft finalized by the Food Hygiene, Sampling and Analysis Sectional Committee had been approved by the Agricultural and Food Products Division Council.

**0.2** Consumers have neither the available knowledge nor the means of determining the hygienic quality of the food they purchase. For this, they rely on the various industries that prepare and handle foods. Unless the factory producing the food is governed by a strict hygiene code in respect of layout, plant and personnel, the quality of the food produced is not considered safe.

**0.3** This standard was first published in 1967. This revision incorporates definitions of terms, raw material requirements and employee hygiene. Besides, other provisions have been updated in order to make it suitable to canneries.

**0.4** This code is an adjunct to IS : 2491-1972*, and it covers requirements specific to the fish industry. The code is being issued in three parts. The Parts I and III of this code cover pre-processing stage and freezing stage, respectively.

**0.5** This code is subject to the provisions in the Factories Act, 1948 and the Prevention of Food Adulteration Act, 1954, and the Rules framed thereunder.

## 1. SCOPE

**1.1** This standard ( Part II ) prescribes the hygienic conditions required for establishing and maintaining a fish canning unit.

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*Code for hygienic conditions for food processing units ( *first revision* ).

## 2. TERMINOLOGY

**2.0** For the purpose of this standard, the following definitions shall apply.

**2.1 Bleeders** — Very small vents through which steam escapes throughout the entire heat process. Bleeding provides a circulation of steam within the retort ( *see* **2.19** ) and ensures the elimination of any air that enters the retort with the steam.

**2.2 Buckle** — A sealed and heat-processed metal container of fish that has become permanently distorted by internal pressure during the heat processing or cooling or as a result of the formation of gas in the container.

**2.3 Canned Fish or Shellfish** — Fish or shellfish packed in containers which have been hermetically sealed.

**2.4 Chilling** — The process of cooling fish or shellfish to a temperature approaching that of melting ice.

**2.5 Clean Sea Water** — Sea water which meets the same microbiological standards as potable water and is free from objectionable substances.

**2.6 Cleaning** — The process of removal of objectionable matter.

**2.7 Come-Up Time** — The time required to bring a loaded retort to the specified processing temperature. Come-up time is not included in heat-processing time.

**2.8 Contamination** — Direct or indirect transmission of objectionable matters to the fish or shellfish.

**2.9 Fish** — Any of the cold-blooded aquatic vertebrate animals commonly included in classes *Pisces*, *Elasmobranchs* and *Crustaceans*. Aquatic mammals, invertebrate animals and amphibians are not included.

**2.10 Flipper** — A sealed and heat-processed container for fish which is normal in appearance but which, if given a sharp jolt, may have its cover or bottom bulged outward. A light inward pressure may cause the cover or bottom to spring back into its normal flat or slightly concave position.

**2.11 Fresh Fish or Shellfish** — Freshly caught fish or shellfish which have received no preserving treatment or which have been preserved only by chilling.

**2.12 Headspace** — The space left in a container for canned fish to allow for the expansion of the contents during heat processing.

**2.13 Heat Process** — The treatment of sealed containers for fish with sufficient heat to destroy or inactivate all micro-organisms that grow at any temperature at which the product is likely to be held and which cause spoilage or might be harmful. A particular heat process is usually described as the length of time the particular product should be exposed to a specified temperature to accomplish the purpose.

**2.14 Heat-Processing Time** — The time of the specified processing temperature to which the sealed containers for fish are exposed.

**2.15 Hermetically Sealed** — Completely sealed and impermeable to air.

**2.16 Leaker** — A sealed and heat-processed container for fish which has a defect that allows the passage of water, gas or micro-organisms.

**2.17 Papelled Container** — A sealed and heat-processed cylindrical metal container for fish, the body wall of which has partly collapsed due to lack of sufficient rigidity to support the vacuum within or has been subjected to excessive external pressure during cooling.

**2.18 Potable Water** — Fresh water fit for human consumption.

**2.19 Retort** — A pressure vessel designed for heat processing of fish packed in hermetically-sealed containers either by saturated steam or by heated water with superimposed air pressure.

**2.20 Sanitization** — The application of hygienically satisfactory chemical agents and processes to clean surfaces with the intention to destroy micro-organisms.

**2.21 Saturated Steam** — Pure steam in equilibrium with water at the same temperature. Under these conditions the temperature of the steam is entirely dependent on its pressure.

**2.22 Shellfish** — Those species of molluscs and crustaceans including cephalopods that are usually used for food.

**2.23 Shelling** — The process of removing shell from molluscs or crustaceans either mechanically or manually.

**2.24 Springer** — A sealed and heat-processed metal container for fish which has one buldging end. If this end is pushed into place the other end buldges.

**2.25 Stack-Burn** — A quality fault in canned fish resulting from inadequate cooling after the heat process. This usually occurs in products which have been either stacked closely or encased while still warm.

**2.26 Swell** — A sealed and heat-processed metal container for fish which has both ends buldged by internal gas pressure.

## 3. RAW MATERIAL REQUIREMENTS

**3.1** No fish or shellfish or other ingredient should be used for the processing of canned products which has undergone deterioration or any process of decomposition or which has been contaminated with foreign matter to an extent which has made it unfit for human consumption.

**3.2** Fresh fish and shellfish intended for canning should receive the same care and attention from the time of capture until these are heat-processed as these would receive if intended for marketing as fresh fish.

**3.3** Shellfish that are stored alive should be kept alive in a hygienic environment up to the time these are processed. Shellfish that die, become weak or appear abnormal in any way, should be immediately removed from the live store and discarded.

**3.4** The standards for handling, preparing, freezing, storing and thawing fish, intended for canning, should be just as high as those applied in the processing of fish into high-quality products for the export market.

**3.5** Fish or shellfish intended for canning should be inspected as soon as it is received at the cannery. Spoiled or contaminated fish should be discarded immediately. Wherever practicable, the fish or shellfish received should be sorted into lots similar in quality and in such attributes as size, colour or texture and then stored appropriately.

**3.6** Where it is considered impracticable to ice fish aboard the catching vessel, these should be brought to the cannery quickly and processed immediately after these are landed.

## 4. PLANT FACILITIES AND OPERATING REQUIREMENTS

### 4.1 Plant Construction and Layout

**4.1.1** Canneries should be adequately equipped to ensure the canning operation without any delay at any stage through lack of processing capacity.

**4.1.2** Canneries and their surrounding areas should be such as can be kept reasonably free of objectionable odour characteristic of spoiled fish, smoke, dust or other contamination. The buildings should be adequate in size to avoid crowding of equipment or personnel, well-constructed and kept in good repair. These should be of such design and construction as to protect against the entrance and harbouring of insects, birds, rodents or other vermins and to permit ready and adequate cleaning.

**4.1.3** Floors should be hard-surfaced, non-absorbent and capable of being properly drained.

**4.1.4** Drains should be of adequate size, suitable type and equipped with traps and removable gratings to permit cleaning.

**4.1.5** Internal walls should be smooth, water-proof and resistant to cracking. These should also be light coloured and readily cleanable.

**4.1.6** All doors through which the product is moved should be sufficiently wide, well-constructed and of a suitable material. The doors should be of self-closing type.

**4.1.7** Ceiling should be so designed and constructed as to prevent accumulation of dirt and condensation and should be easy to clean.

**4.1.8** All plumbing and waste-disposal lines, including sewer system, should be large enough to carry peek loads and should be properly constructed.

**4.1.9** Premises should be well-ventilated to prevent objectionable odours, excessive heat, condensation and contamination with dust, vapour or smoke.

**4.1.10** Areas where fish or shellfish are received, stored or handled should be separated from areas in which final product preparation is carried out to prevent contamination of the finished product.

**4.1.11** A separate refuse-room or alternatively adequate facilities for storage of refuse should be provided on the premises.

**4.1.12** A by-product plant, if provided, should be separate from the cannery processing fish and shellfish for human consumption.

**4.1.13** Proper facilities for washing and sanitization of equipment including protective hand coverings should be provided ( *see* IS : 5735-1970* ).

**4.1.14** Sufficient and suitable sanitary conveniences shall be provided, maintained and kept clean in every cannery. The conveniences shall be properly lighted. Separate conveniences shall be provided for each sex. No convenience shall open directly into any work room in the cannery. The conveniences shall always be maintained clean and in good repairs. Sufficient number of wash basins with adequate provision of nail brushes, soap and towels should be provided. The wash basins shall be installed in or alongside the sanitary conveniences.

**4.1.15** For staff working in the plant, sufficient number of lunch-rooms, changing-rooms, bath-rooms and washing places should be provided.

### 4.2 Equipment and Utensils

**4.2.1** All work surfaces and all containers, trays, tanks or other equipment used for processing fish or shellfish should be of smooth, impervious, non-toxic and corrosion-resistant material and should be so designed and constructed as to permit easy and thorough cleaning and prevent health hazards.

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*Recommendations for maintenance of cleanliness in fish industry.

**4.2.2** Canneries should have adequate, clean and dry storage space for their supplies of containers and suitable conveyor systems to transport these to filling machines or packing tables without exposure to contamination.

**4.2.3** Cracking blocks, mallets and other meat-extracting devices used in processing of fish or shellfish should be constructed of non-absorbent and corrosion-resistant material.

**4.2.4** Fish transport vehicles should be designed to allow adequate icing of fish, to protect fish from warming up during transport and should be of such material and construction as to permit easy and thorough cleaning.

### 4.3 Hygienic Operational Requirements

**4.3.1** The building, equipment, utensils and other physical facilities of the plant should be kept clean, in good repair and should be maintained in an orderly and hygienic condition.

**4.3.2** Removal of solid, semi-solid or liquid wastes from fish unloading, holding and processing areas should be on a continuous or a near-continuous basis by using water and appropriate equipment so that these areas are kept clean and without any danger of contamination of the product.

**4.3.3** Effective measures should be taken to protect against the entrance into the premises and the harbourage on the premises of insects, birds rodents, or other vermins.

**4.3.4** Entry of dogs, cats and other animals should be prohibited in areas where fish or shellfish are received, handled, processed or stored.

**4.3.5** Conveyances used for transporting fish or shellfish should be cleaned and sanitized immediately after each use and should be so maintained as not to constitute a source of contamination for the product.

### 4.4 Operational Practices and Production Requirements

**4.4.1** Canned fish products should be from good quality fish, well prepared in suitable sealed containers and preserved by heat so that these remain attractive and safe for a long time under normal conditions.

**4.4.2** Only good-quality fish or shellfish should be used for canning.

**4.4.3** The operations of gutting, heading, skinning, boning or portioning should be done in a clean and hygienic manner and should be carried out carefully to avoid spoilage of the product or wastage of material.

**4.4.4** Fresh fish should be thoroughly washed in cool water of potable quality immediately after these have been subjected to any dressing operation.

**4.4.5** Detergent solutions should be changed and detergent tanks and other apparatus thoroughly cleaned at regular intervals.

**4.4.6** The containers used for canning of fish should be made from suitable material and so constructed that they can be easily sealed to prevent the entry of any contaminating substance.

**4.4.7** The containers should be inspected immediately before delivery to the filling machines or packing tables to ensure that these are clean, undamaged and without visible flaws.

**4.4.8** Precautions should be taken to ensure that the containers for canned fish are used only for their intended purpose.

**4.4.9** Empty containers for canned fish should be removed from the packing room and from conveyors to the filling machines before the cannery is washed between shifts and at the end of a processing period.

**4.4.10** Where canned fish is hand-packed there should be a steady supply of raw material and empty containers within convenient reach of each packer. Filled containers should be inspected and removed to the sealer frequently. Piling of either raw material or filled containers at the packing table should be avoided.

**4.4.11** Filling machines used to pack fish or shellfish for canning should be closely attended to while in operating the machines, manufacturer's instructions concerning their operation, adjustment and maintenance should be carefully followed.

**4.4.12** All canned fish should be inspected for quality just before the containers are sealed.

**4.4.13** The canned fish should be produced with sufficient vacuum to prevent the containers from buldging under conditions of high temperature or low atmospheric pressure likely to be encountered during the transport, storage or marketing of the product.

**4.4.14** Filled and sealed metal containers should be thoroughly washed before heat processing.

**4.4.15** Every cannery should develop procedures to prevent unprocessed canned fish from being accidentally stored without heat processing.

**4.4.16** Heat processing should be commenced as soon as possible, preferably within one hour after the containers have been sealed.

**4.4.17** Care should be taken to ensure that all heat-processing operations are adequate to inactivate any harmful micro-organisms that might be present.

**4.4.18** The timing of a heat process should not be commenced until the minimum safe venting time has elapsed and the temperature of the retort has been raised to the specified processing level.

**4.4.19** The heat-processed canned fish should not be handled before cooling and drying. It should never be handled roughly or in such a way that its surfaces, particularly its seams, are exposed to contamination.

### 4.5 Water Supply

**4.5.1** There shall be an adequate supply of safe and potable water ( *see* IS : 4251-1967* ). Running water under pressure shall be easily accessible to all rooms and areas in which fish is handled and equipment are washed.

**4.5.2** The equipment shall be so installed and used that back siphonage of liquid into the potable water lines is precluded.

**4.5.3** Hot and cold water in ample supply shall be provided for plant clean-up needs, where necessary.

**4.5.4** The storage tanks for water should, unless completely sealed, be kept covered with tight-fitting lids, examined regularly and cleaned out at least once every six months. The date of the last cleaning and next cleaning shall be prominently displayed on the storage tanks.

**4.5.5** The water shall be periodically examined chemically and bacteriologically as desired by the Licensing Authority. A record of such examination shall be maintained.

**4.5.6** *Ice* — Ice should be made from water of potable quality and should be manufactured, handled, stored and used, so as to protect it from contamination ( *see* IS : 6540-1972† ).

**4.5.7** *Auxiliary Water Supply* — Where a non-potable auxiliary water supply is used, the water should be stored in separate tanks and carried in separate lines, identified by contrasting colour and with no cross-connections or back-siphonage with the lines carrying potable water.

### 4.6 Packaging of Finished Product

**4.6.1** *Materials* — Packaging materials should not transmit to the product objectionable substances beyond acceptable limits and should provide appropriate protection from contamination.

**4.6.2** *Techniques* — Packaging should be done under conditions that preclude the introduction of contamination into the product.

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*Quality tolerances for water for processed food industry.

†Code for hygienic conditions for manufacture and handling of ice for human consumption.

**4.6.3** *Preservation of Finished Product* — Methods of preservation should be such as to protect against contamination, deterioration, or development of a public health hazard. Such methods should be approved by the official agency having jurisdiction.

**4.6.4** *Storage and Transport of Finished Product* — The finished product should be stored and transported under such conditions as not to cause deterioration of the product or damage the container leading to microbial or other contaminations of the finished product.

### 4.7 Employee Hygiene

**4.7.1** Every person employed for fish handling in the cannery shall be medically examined by an authorized registered medical practitioner and the examination shall include X-ray of the chest for tuberculosis. The examination shall also include examination of stool for protozoal and helminthic infestation for those parasites which are transmitted by ingestion, and for the presence of *Salmonella*, *Shigella* species and *Vibrio cholerae*; urine; and blood examination for venereal diseases. Subsequently, the employee shall be medically examined once a year or more frequently, if necessary, to ensure that he is medically fit and free from communicable diseases. A record of such examination shall be maintained.

**4.7.1.1** It shall be impressed on all employees that they should notify the medical officer or management, cases of fever, sore throat, cough, vomiting, diarrhoea, typhoid, dysentery, boils, cuts and sores and ulcers ( however small ), discharging ears and notifiable diseases occurring in their own homes and families.

**4.7.1.2** No worker who is suspected to be suffering from any of the disorders listed in **4.7.1.1** shall be permitted to work inside the cannery unless found medically fit. The supervisor shall check the personal hygiene of the workers before the start of work and whenever they enter any processing room after any absence.

**4.7.2** Employee shall keep their finger nails short and clean and wash their hands with soap or detergent and water before commencing work and after each absence, specially after using sanitary conveniences. Towels used for drying hands should be clean. No worker shall allow his clothing or any part of his/her body other than his/her hand from elbow downwards to come in contact with the fish. He should adopt strict hygienic practices so as to avoid adding any microbial contamination to the material.

**4.7.3** All employees shall be inoculated and vaccinated against the enteric groups of diseases once every 2 years and against smallpox once every 5 years. In case of an epidemic, all workers shall be inoculated. A record shall also be maintained.

**4.7.4** No worker shall be allowed to work without proper clothing and foot-wear.

**4.7.5** Employees shall be provided with clean uniforms ( preferably white ) or aprons or both and clean washable caps, where necessary.

**4.7.5.1** Separate room or place for changing the clothes shall be provided. The clothes shall not be hung in any processing room.

**4.7.5.2** The uniforms shall not be worn outside the cannery but put on just before starting the work and changed when leaving.

**4.7.6** Eating, spitting, nose cleaning or the use of tobacco in any form or chewing betel leaves shall be prohibited within the manufacturing, packing and storage area of the cannery. Notice to this effect shall be prominently displayed and enforced.

## INDIAN STANDARDS ON FOOD HYGIENE

IS:

| | |
|---|---|
| 2491-1972 | Code for hygienic conditions for food processing units ( *first revision* ) |
| 4303 ( Part I )-1975 | Code of hygienic conditions for fish industry : Part I Pre-processing stage ( *first revision* ) |
| 5059-1969 | Code for hygienic conditions for large scale biscuit manufacturing units and bakery units |
| 5404-1969 | Code of practice for handling of food samples for microbiological grade |
| 5837-1970 | Code for hygienic conditions for soft drinks manufacturing units |
| 5839-1970 | Code for hygienic conditions for manufacture, storage and sale of ice-creams |
| 6540-1972 | Code for hygienic conditions for manufacture and handling of ice for human consumption |
| 6541-1972 | Code for hygienic conditions for establishment and maintenance of mid-day school meal programme |
| 6542-1972 | Code for hygienic conditions for fruit and vegetable canning units |
| 6968-1973 | Code for hygienic conditions for *PAN* ( betel leaf ) stalls and vendors |
| 6969-1973 | Code for hygienic conditions for handling and sale of refrigerated drinking water |
| 7003-1973 | Code for hygienic conditions for sago ( *SABOODANA* ) manufacturing units |
| 7005-1973 | Code for hygienic conditions for production, processing, transportation and distribution of milk |

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